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Environmental Training Modules Executive Summary and User's Guide

U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION,
NAVAL SURFACE WARFARE CENTER

in cooperation with
National Steel and Shipbuilding Company
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Environmental Training Modules

(N1-94-02)

Executive Summary and User's Guide

NSRP 0540

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April 6, 1999

Table of Contents

Introduction	1
Training Module Design.....	1
Training Modules Overview	2
Module 1 - NSRP 0541 Good Environmental Practices	2
Module 2 - NSRP 0542 Environmental Practices for Specific Craft/Trade Groups	2
Module 3 - NSRP 0543 Shipyard Incident Response Training.....	2
Module 4 - NSRP 0544 Shipyard Oil Pollution Prevention and PIC Training	2
Module 5 - NSRP 0545 General Environmental Awareness	3
Module 6 - NSRP 0546 Technical Overview of Environmental Statutes and Regulations	3
Module 7 - NSRP 0547 Environmental Requirements of Concern to Shipyards	3
Module 8 - NSRP 0548 Generation/Treatment/Minimization of Hazardous Waste.....	3
Module 9 - NSRP 0549 Hazardous Waste Operator Training	3
Module 10 - NSRP 0550 Environmental Training for Subcontractor Personnel.....	4
Using the Training Material	4
Key Issues	4
Strategic Value Of Training.....	4
Starting With Effective Performance.....	4
Performance-Based Training:.....	5
Planning And Delivering Training	5
Analyzing the Situation.....	6
Defining Evaluation Strategies, Criteria, and Tools	7
Getting Training to Work	8
Barriers To Application Of The Learning Experience.....	9
Customizing the Training Modules	10
Appendix I: Hardware and Software Requirements.....	11
Software Requirements	
Software Needed (Minimum Versions):.....	
Hardware Requirements	

Appendix II: Customizing the Shipyard Training Modules	12
Introduction	
Modifying the Student's Manual.....	
Modifying the training presentation material	
Integrating Pictures into the Presentations	

Environmental Training Modules

NSRP 0540 through 0550

Project N1-94-02

Executive Summary and User's Guide

NSRP 0540

Introduction

National Shipbuilding Research Program Project N1-94-02, entitled "*Environmental Training Modules*" consisted of the development of ten individual sets of training and presentation material specific for the shipbuilding and repair industry. The development of this training material was based upon a previous NSRP project (N1-91-1, Report # 0366) entitled "*Master Plan for Environmental Education*". This project identified the environmental training needs that currently existed within the shipbuilding and repair industry. On the basis of this needs assessment, ten training modules on various subjects were recommended for development. The *Environmental Training Modules* project is the implementation of these recommendations.

National Steel & Shipbuilding Company ("NASSCO") was the prime contractor to develop the training modules. Dana M. Austin Environmental Consulting, Inc. ("ECI") (formally Austin Environmental, Inc.) assisted in this development. The project was funded in two phases, with several training modules developed during each phase. Training was conducted at NASSCO using various training modules to obtain feedback for possible modifications to the training materials. Additionally, substantial modifications to the training materials, including module titles, were made at the recommendation of the project manager and the NSRP Facilities and Environmental Effects Panel (SP-1).

Training Module Design

Training Modules were developed using the following design formula:

- Each training Module is to cover a particular subject area.
- Modules are to consist of several individual training Sessions, presented in sequence to convey the required information regarding the subject area.
- Each training Session is to consist of a set of written training materials (student manual) and presentation materials (training slides).
- To the extent possible, each training Session shall present information on a particular aspect of the Module subject area on a "stand-alone" basis.
- Each set of training Sessions (i.e. written material and presentation material) is intended, to the extent possible, to be versatile enough to be given in either a classroom or gang-box training format.

- Training Sessions from the same or different Modules may be arranged in any appropriate order to suit the needs of the training audience.
- Training Sessions are to be prepared in standard format using generally available word processing and slide presentation software in order to allow the user to easily customize the written and presentation material for their own facility and workers.

Training Modules Overview

Module 1 - Good Environmental Practices (NSRP 0541)

Content: Craft/trade-specific training on items that workers must deal with on a regular basis - material handling, labeling, waste generation/minimization, requirements awareness.

Recipients: New employees on arrival, and existing workers as a refresher.

Training Hours and Frequency: 8 hours, annually (not all at once, but 1 to 2 hours a day).

Module 2 - Environmental Practices for Specific Craft/Trade Groups (NSRP 0542)

Content: Specific training on air, hazardous materials, waste minimization, and related environmental considerations, with a focus on the generator personnel and their individual practices and procedures. Emphasis on those personnel likely to encounter a high incidence of problems during their regular duties.

Recipients Specific craft/trade groups of workers.

Size and Frequency: 4 to 8 hours, annually.

Module 3 - Shipyard Incident Response Training (NSRP 0543)

Content: Detailed presentation of response requirements specified by OSHA. Basic ingredients of a viable program for a shipyard - what is required and how to reach a satisfactory state of readiness. Includes specific duties of all participants, and as well as how to ensure coordination and a common focus. This Module will provide the shipyards with an in-house capability for conducting this important training.

Recipients: Environmental Manager, Environmental Staff Personnel, Safety Engineer, Safety Personnel, Fire Department Personnel, Laboratory Staff and Technicians, Emergency Response Coordinator, Medical Personnel.

Size and Frequency: 40 hours, annually.

Module 4 - Shipyard Oil Pollution Prevention and PIC Training (NSRP 0544)

Content: Provides a detailed overview on the federal regulatory oil pollution prevention and response requirements. Also contains specific training material for those shipyard employees with designated “Person in Charge” responsibilities.

Recipients: Ship and Craft Managers and Leadmen, Environmental and Safety Department Personnel, designated Persons in Charge

Size and Frequency: 8 hours initial; 8 hours, annually.

Module 5 - General Environmental Awareness (NSRP 0545)

Content: Overview of environmental statutes and regulations affecting shipyards, including responsibilities for compliance including both civil and criminal penalties for non-compliance. Includes an overview and explanation of environmental processes - how laws are formulated, the role of environmental groups, consultants, advisers.

Recipients: Senior Management.

Size and Frequency: 2 hours, annually.

Module 6 - Technical Overview of Environmental Statutes and Regulations (NSRP 0546)

Content: A general but in-depth overview of all environmental statutes and regulations with a focus on shipyard interests, and emphasis on the technical aspects of the requirements.

Recipients: Environmental Managers and staff personnel.

Size and Frequency: 6 hours, annually.

Module 7 - Environmental Requirements of Concern to Shipyards (NSRP 0547)

Content: General overview of ALL requirements as they apply to shipyards. Emphasis on technical aspects and actions needed for compliance, rather than on the penalties for non-compliance. Includes overall strategy for developing a strong environmental posture.

Recipients: Senior Management, Supervisors, Generator Personnel; all workers who interface with environmental matters.

Size and Frequency: 3 hours, annually.

Module 8 - Generation/Treatment/Minimization of Hazardous Waste (NSRP 0548)

Content: Discussion of regulatory requirements and statutes that apply to shipyard hazardous waste activities. Stresses the high points of the laws, and how to satisfy them. Includes overview of training provided to hazardous waste operators.

Recipients: Middle-level Managers

Size and Frequency: 4 hours, annually.

Module 9 - Hazardous Waste Operator Training (NSRP 0549)

Content: Detailed training on practices and procedures performed by hazardous waste operators. Includes reclamation techniques, safe handling practices, labeling/marking, inventory control, hazard minimization.

Recipients: Hazardous Waste Operators; helpers and assistants

Size and Frequency: 24 hours, initially; 8 hours, annually.

Module 10 - Environmental Training for Subcontractor Personnel (NSRP 0550)

Content: Briefing on environmental requirements and considerations applicable to all Subcontractor Personnel entering a shipyard environment.

Recipients: Subcontractor Personnel; visitors to a shipyard; transient personnel such as delivery agents, auditors, and oversight personnel.

Size and Frequency: 1-3 hours, depending upon site requirements.

Using the Training Material

The shipyards are large, complex industrial organizations. Compliance with occupational safety, health, and environmental regulations is critical to shipyard business operations. Development of a comprehensive and effective environmental training program can both reduce liability and improve shipyard business performance.

Key Issues

When implementing a comprehensive environmental training program numerous questions will immediately arise. Several that may occur to you are:

- How can we conduct affordable, effective training?
- Who should receive training, and how much training is enough?
- How can we use the training program to reduce our exposure to risks?
- How can we measure (and improve) the effectiveness of the training?
- What are the best ways to deliver the training?
- How do we recognize when training is not the solution to a problem that needs solving?

This section addresses these questions.

Strategic Value of Training

The strategic value of training comes from increasing individual and organizational competence and from broadening competence throughout the organization. Competence is defined as the ability to do a job successfully. Personnel that are more competent add greater value to an organization than personnel that are less competent. Increased competence returns a greater value than its cost. Training plays a vital role in building competence.

Starting With Effective Performance

Where should an environmental training program begin? In light of the strategic value of training, perhaps the best answer is to begin with your current performance problems! Let's begin by reviewing the elements of effective performance and performance-based training.

In any given work situation everyone tries to determine what makes sense to him or her in a given situation. To decide what make sense to them, they ask (and answer) four questions:

- What do I have the means to do?
 - ◆ *focuses on mechanisms, processes and procedures*
- What do I know to do?
 - ◆ *focuses on outputs and standards of performance*
- What do I know how to do?
 - ◆ *focuses on skills and know-how*
- What motive do I have for doing it?
 - ◆ *focuses on motivations*

Based on the *feedback* that they receive on their performance, they *adjust* their actions accordingly. Therefore, in order to improve an individual's performance, we must change what it makes sense to them to do, and we must give them prompt, specific, direct, reliable, and useful feedback about their performance in the context of the business objectives of the shipyard.

Performance-Based Training:

The objective of performance-based training is improved performance through heightened learning for the least amount of money. In this context, here is what training can and cannot do:

- Training can increase individuals' know-how.
 - ◆ *helping personnel to become more competent in their jobs*
- Training can change what individuals know to do.
 - ◆ *making clear to personnel what they should do*
- Training will not improve the means available to do the job.
 - ◆ *insufficient means however can increase the need for training*
- Training will not reliably motivate personnel.
 - ◆ *factors in the work environment are much more powerful*
- Training will not substitute for useful feedback.
 - ◆ *personnel need feedback about how they are applying the training*

Even superior training is only part of the performance equation. The *message* is to train people to know what is expected of them and to know how to do it.

Planning and Delivering Training

Planning and delivering safety, health, or environmental training consists of: (1) analyzing the situation; (2) preparing for training; and (3) defining evaluation strategies, criteria, and tools.

Analyzing the Situation

Analyzing the situation is the first step in planning and delivering training. Analyzing the situation consists of: (1) identifying a performance improvement need; (2) conducting a training needs assessment; and (3) identifying the target audience for the training.

In order to get the greatest return on an investment from the training program, one must first identify a need to improve performance. Such needs often manifest themselves through self-evaluations or external management audits and inspections. Performance measurement systems also can point to performance improvement needs. Are incident rates rising? Are costs associated with hazardous waste disposal rising? Where are the areas of weakest compliance or greatest risk? What are the greatest liability concerns? Performance improvements might also be dictated by changes in regulatory requirements (e.g., the introduction of new performance standards or new work process controls) or improvements in technology (e.g., the introduction of new, less hazardous materials or new pollution prevention equipment). Note that a training program often can offer the highest return on investment when it is used proactively as a strategy to help prevent problems from occurring.

Once you have identified a need to improve performance, conduct a training needs assessment to determine who needs to be trained and the topic areas of the training program. The training needs assessment will enable you to define the specific training required to improve performance. In order to assess training needs, collect information to evaluate: (1) what is being done now; and (2) what should be done (either now or in the future). Observe current job performance, interview personnel, and collect work samples, as required. Define the gap in performance as specifically as possible. Is this gap due to lack of employee awareness or lack of requisite job skills? Such situations are good candidates for using a training program as an improvement strategy.

Next, identify the target audience for the training program in terms of functional training groups (“FTG”). A FTG is that group of shipyard personnel that require the training based on a common element, such as a craft or trade (i.e. pipefitters) or required performance (i.e. designated PICs). The FTGs will identify the segment of the work-force population from which the students to be trained will be drawn.

Once you have analyzed the situation, you are ready to prepare the instructional materials. Preparation of the instructional materials consists of: (1) assembling the required information resources; (2) defining the training objectives; (3) selecting the instructional strategies; (4) creating the instructional materials; and (5) identifying and scheduling the training program resources.

Use the results of the training needs assessment to assemble the required information resources. Primary information resources include the Sessions of the Training Modules. First, identify the applicable training module sessions and their associated presentation materials. If training gaps are evident based on the needs assessment, consider preparing custom materials using the same format to bridge the gaps. When all the textual material has been assembled, it can be reproduced as a “student manual” for the training audience.

Next, define the objectives of the training program. State the training objectives in terms of job performance objectives. Well-stated training objectives are phrased in terms of behaviors, standards, and conditions. Behaviors encompass what or how the students *should be able to perform* at the completion of the training program. Standards describe *how well* the students

should be able to perform the behavior. Conditions, as the name indicates, describe the *conditions* under which the students will be expected to perform the behavior. Well-stated training objectives help to keep the training program on target.

Select appropriate instructional strategies based on the objectives you want to achieve from the training program. Instructional strategies dictate how the training will be conducted. For example, the strategies used to deliver spill response training might include a demonstration and a practice exercise. A regulatory overview might rely on a lecture, manual, case studies, and open discussion. You must select the instruction strategies before creating the instructional materials or scheduling the training resources.

As a final step, identify and schedule the training resources needed to conduct the training program. The training resources needed will be dictated by the instructional strategies and instructional materials. Resources encompass training facilities, equipment, and training aids, as well as the *instructors and students*. In particular, ensure that qualified instructors are available to present the training program. Notify students of the training subject, time, and location of the training at least two weeks prior to the scheduled time, and give them instructions for notification of cancellations.

Defining Evaluation Strategies, Criteria, and Tools

Once you have prepared for the training program, you are ready to define the evaluation strategies, criteria, and tools that you will use to assess the effectiveness of the training.

Determining how you will evaluate the effectiveness of the training to be delivered is an essential aspect of planning and preparing the training program. Essentially, all training programs require a reaction evaluation from the students. Did the students like the learning experience? The students should feel that the training met their needs. If they feel it did not meet their needs, then they are not likely to be motivated for further training. Reaction evaluations measure whether the students liked the training program, but they do not evaluate whether learning has occurred. A learning evaluation answers the question: “Did the students achieve the objectives established for the learning experience?” If the training program is being delivered to improve job performance, then a learning evaluation is usually warranted. If the training program is being delivered to provide students with a qualification or certification, then a learning evaluation *is required*.

Learning evaluations measure how much of the content of the learning experience students absorb and remember during and immediately following the training program. However, that demonstration does not guarantee that the learning will be applied to the job. A performance change evaluation answers the question: “Are the students applying the learning on the job?” If the training program is being delivered to improve job performance, then a performance change evaluation is warranted. In most cases, since environmental training is regulatory-driven, existing self-evaluations are likely to address at least some aspects of the objectives of the training program. If they do not, they must be updated with the appropriate evaluation criteria. Remember that performance change is the payoff from training, and that measuring performance change is the most important aspect of evaluating training.

The fourth level of evaluation, cost-benefit, seeks to determine whether organizational performance has improved as a result of the training. Typically, this level of evaluation is measured using quantifiable performance measures which are already tracked and reported by the

organization (e.g., accident rates). The challenge is in drawing a cause-effect relationship between the training program and the performance trend. If you are able to do so, you will be able to demonstrate the overall value of the training program to the organization.

Once you have defined the evaluation strategies and criteria, develop the tools to conduct the evaluation. Reaction evaluations are relatively easy to measure through questionnaires or interviews during and immediately following the training. You can ask the students for the good and bad points of a day or session, what they liked and did not like, etc. At the end of the training program, you can ask for an overall reaction from the students. Learning evaluations are relatively easy to measure through examinations and demonstrations derived directly from the performance and learning objectives. Examinations can be conducted in writing *or* verbally. For example, if the performance objective is to be able to correctly identify a hazardous waste, then the students should be asked to demonstrate to the instructor the correct procedure for making a waste determination.

Getting Training to Work

A common concern of environmental managers is that although extensive training is conducted, the value of the training is questioned because the impact on performance may seem limited. Performance-based training seeks to address this concern through use of a system that helps to: (1) focus the learning experience on job performance objectives; and (2) reinforce the use of the newly-learned knowledge, skills and abilities in the work environment.

Performance-based training can be distinguished from other forms of training by three key elements:

- *Focus.* Give workers training that support the specific duties of their positions. Do not dilute the training with factors that have nothing to do with effective performance.
- *Acclimation.* Give workers training to help them understand what is important to the shipyard and what is expected from them. Give this training to them early.
- *Problem-Solving.* Give workers training to help them know that one of their responsibilities is to improve shipyard processes and performance. Give them the skills *and the chance* to do so.

How people learn influences the elements of a performance-based training program:

- *People learn by doing.* They learn best when they actively participate in the learning experience. They learn needed skills when they actually use those skills.
 - ◆ *make training interactive to the extent possible*
- *People forget learning quickly if they do not apply it.* They learn best when they put the skills they learn to work immediately on the job.
 - ◆ *provide opportunities to practice new skills on the job*

Recognition of these aspects of performance-based training assists in formulating strategies to ensure that training will have positive impacts on job performance that translate into improved performance.

Barriers To Application Of The Learning Experience

It is important that the work environment supports application of the learning experience *in* the work environment. There are eight common reasons why employees fail to transfer the knowledge, skills, and abilities acquired from the learning experience to the work environment. These reasons can be categorized by: (1) conditions of the employees; (2) conditions of the first-line supervisors; and (3) conditions of the organization.

Conditions Of The Employees:

- *Lack Of Confidence To Use Skills.* Sometimes individuals leave a learning experience lacking the confidence to successfully use the skills they learned on the job. This situation could be the result of insufficient opportunities to practice the skills while in the learning experience.
- *Disagree With Values And Concepts Which Have Been Taught.* If the individuals feel that the values and concepts being taught in the program are contrary to their personal beliefs, then there will be less motivation to use the skills. For example, if a manager does not believe in the concept of “empowerment,” it is less probable that he will utilize the behaviors which support an empowering approach to management.

Conditions Of The First-Line Supervisors:

- *Lack Of Reinforcement.* Reinforcement is a process of providing feedback to an individual when that person has utilized the desired skills. When reinforcement does not occur, people are less likely to use the skill on the job.
- *Lack Of Coaching.* This is the process of guiding an employee in applying the skills to the job. Lack of a coach on the job is a serious obstacle to skill transfer.
- *Lack Of Positive Models.* To what degree are managers perceived as using and supporting the desired skills? If employees are taught to follow safety procedures and precautions, are their own supervisors following these procedures and precautions? Internal alignment is critical to the process of skill transfer.

Conditions Of The Organization:

- *Task Interference.* Any system barrier which inhibits use of skills such as lack of authority, conflicting procedures or policies, lack of time, lack of information or tools.
- *Lack Of Organizational Feedback.* The feedback the organization, as a *system*, provides to indicate that use of a particular set of skills is important. For example, if an employee has been taught to follow safety procedures and precautions, what does the organization do to communicate that a safe work environment is a valued goal?
- *Lack Of Rewards Or Incentives/Presence Of Punishments.* When there is no reward or incentive for using a skill, or if the use of it will result in a type of *punishment*, skills will be extinguished. The most obvious rewards are those associated with the performance appraisal and incentive pay systems however, there are also informal rewards and punishments such as peer pressure and cumbersome paperwork.

Customizing the Training Modules

The training Modules were designed to be easily customized by the end-user to accommodate the difference in facilities, state environmental requirements and changes to the federal regulatory programs. Customizing the Modules can be done the following ways:

- Changing the order of the training Sessions in a given Module to present the information in new manner.
- Removing training Sessions from a given Module to only give the information required by audience.
- Combining training Sessions from various different modules to create a new Module on combined subject areas.
- Preparing new training Sessions and Presentation materials to bridge gaps in required training subject areas for a particular training audience.
- Replacing the photographs and illustrations that are currently embedded in the Presentation slides with facility specific photos or illustrations.

All of these techniques can be used as needed to prepare a more effective, up-to-date and facility specific training program, with a minimal amount of effort. Detailed information on how to customize both the written and presentation material is provided in Appendix I and II.

Appendix I: Hardware and Software Requirements

Software Requirements

The basic software requirements will enable the user to fully modify the training program to fit into their organization. The software can be operated by individuals who have a basic understanding of personal computers (PCs), and “IBM compatibles” as well as experience with working in a Windows environment.

Software Needed (Minimum Versions):

Microsoft Windows 3.1

Microsoft Word 6.0

Microsoft Power Point 6.0

Corel Photo-Paint Version 5.0 (or other photo graphics software)

Hardware Requirements

The software required to modify and fully utilize this document has basic hardware requirements that must be fulfilled to run the programs. The minimum hardware arrangement will be very slow for modifying the presentations and the photographs. The photographs take a significant amount of memory and processing time. It is very desirable to have a Pentium processor and enough memory to store the training program on the hard drive. The table below displays the minimum requirements and a recommended computer hardware system for maximum use of the training document.

Minimum Requirements	Highly Recommended
Processor: 386	Processor: 486 or a Pentium
RAM: 8 Megabytes	RAM: 16 Megabytes or more
Hard Drive: 240 Megabytes	Hard Drive: 1 Gigabyte or more
Display: VGA	Display: SVGA
Mouse	Mouse: Logitec
Windows 3.1	Windows 95
iomega Zip Drive 100	iomega Zip Drive 100
Microsoft Office 6.0	Microsoft Office 7.0
	CD ROM
	Math Co-Processor
	Video Card - w/1M DRAM or more
	Color Scanner

Appendix II: Customizing the Shipyard Training Modules

Introduction

Both the student manual and presentation materials can be modified to meet the requirements of your facility. This is easy to accomplish using the hardware and software tools identified in this section.

Modifying the Student's Manual

Customizing the student's manual merely requires modifying the appropriate training "session" to meet your requirements. All the training sessions are prepared in Microsoft Word for Windows version 7.0. The session pages are in a column format with a single line between the columns. When modifying the document, you may find it easier to change the column format to "one column" prior to making changes, then return the format to "two columns, right" with a line between the columns.

Modifying the training presentation material

The presentation material is prepared in Microsoft Power Point 4.0 and can be modified by using either Power Point for Windows version 3.1 or Power Point for Windows 95. There is a set of presentation materials for each training session in the student manual. Ensure that the presentation is updated to be consistent with the student's manual if the training sessions are modified.

The presentations include photo and/or video images taken from actual shipyard operations. This is done to increase training comprehension and retention by providing the student with a familiar frame of context for specific training sessions. These photos and/or video images can be customized for your facility and personnel by using the following step by step procedure.

Integrating Pictures into the Presentations

In many cases, shipyards will want to integrate pictures from their own operations into the presentation. This is easily accomplished using Corel Photo-Paint.

First Step - Getting Photos and Graphics in a Format that the Computer can Read:

There are several methods whereby this can be accomplished. One method is to take 35mm pictures and have them transferred to CD-ROM. Kodak *Photo CD* is an excellent method. Consult your local photo developing labs about this process. It takes approximately 7 days and the cost is approximately \$3.00 a picture.

A second method is to scan the pictures yourself on a personal scanner. This may be accomplished in the publishing department of the shipyard or at a local copy shop. The photos are usually saved as "tif" files (i.e. HAZMAT.tif). For information concerning the type of files will also work, consult your Corel and Microsoft word Manuals.

A third method is to use a camcorder to collect desired pictures at the shipyard, then "capture" a frame image using a video frame "grabber" such as "Snappy" or "Grabit" (\$200.00 and \$150.00 respectively). Video frame grabbers are external computer cards which plug into a printer port on

your computer and are connected to your video camera. Using the provided software, you play the video through the computer and capture any image which you require. These images can be saved on to your hard drive or a floppy disk and dropped into Power Point presentations as an “object” or “picture”.

Second Step: - Integrate photos into the Presentation.

- 1) In Microsoft Power Point, photos and graphics are inserted as “Objects”.
- 2) To add a picture to a presentation, Insert an Object. Double Click on the Object box. The computer will ask from what application (Corel Photo-Paint) you want to create the object. Select Photo-Paint.
- 3) The first screen asks for the size and resolution of the photo. For a typical horizontal slide, set parameters to (Width = 378 Pixels, Height = 256 Pixels, Resolution 300, Color Mode = 256). Experiment with these settings to match your picture requirements.
- 4) Once in Photo-Paint, input “Edit” - “Paste From File”. Now, if you have the photo on CD, identify the drive and the picture desired. Click “OK.”
- 5) It is a good idea to perform some picture enhancements prior to fully importing the photo into Photo-Paint. When the first window comes up, click on “Image Enhancement”. The Kodak color corrections functions are the best. Try to enhance the photo by adding green, red, blue, brightness, and/or sharpness with the provided functions. Once the picture looks acceptable, click, “OK”.
- 6) Now, the picture is on the screen inside the dimensions that you set in the parameters. The picture should be close to the size identified. Only the picture inside the dimensions specified will be transferred to Microsoft Power Point or Word.
- 7) Now, click on “File” - “Close and Update”, this closes Corel Photo-Paint and returns you back to Power Point. The picture will show up on the screen as a very small image. Click on the picture and **drag a corner**. This will increase the picture size without distorting the picture.
- 8) Cropping the picture is frequently helpful. Click on the picture and then pull down the TOOLS menu and CROP PICTURE. The Crop function allows you to cut the picture and focus into a particular area. Once the picture is cropped, click on the Arrow and then click on the picture to enlarge and position it properly. Remember, always enlarge the photo by dragging from the corner.

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